BITT305/BCST305

Total no. of printed pages: 2

Roll no.

Odd Semester Examination, 2019-20
B. Tech (CSE/IT/PPE, 3rd Semester)

OBJECT ORIENTED PROGRAMMING & METHODOLOGY

Time: 3 hour

Max. Marks: 100

Note : *(i)* *Attempt **ALL** questions and all Questions carry equal marks.*

1. Attempt ***any four*** parts of the following: (5 × 4 = 20)

(a) Differentiate between a class and object with some example. Also prepare a list of objects that you would expect each of the following systems to handle;

(i) a program for laying out a newspaper (ii) a catalogue store order entry system.

(b) What are the advantages of object oriented programming over other programming languages?

(c) Draw a use case diagram for the college management system.

(d) What do you mean by encapsulation? Explain it with an example.

(e) What do you mean by event? What are the different types of event?

(f) Explain advanced dynamic Modelling concepts.

2. Attempt ***any four*** parts of the following: (5 × 4 = 20)

(a) Define SA/SD.

(b) Write short notes on architectural modelling with suitable example and diagram.

(c) Discuss the collaboration diagram with an example.

(d) Define state machine. Draw a state machine diagram for train departure form a station.

(e) Write a short note on Jackson Structured Development (JSD).

(f) Explain in brief OMT (object Modelling techniques) methodologies.

3. Attempt *any two* parts of the following: (10 × 2 = 20)

(a) (i) Why is Java called machine independent language? Explain

(ii) What is a JVM? Explain their use.

(b) (i) Explain the different features of java programming language.

(ii) Describe the various data types and string matching functions used in java.

(c) Write short notes on the following:

i) Applet and its life cycle. ii) Java servlets.

4. Attempt *any two* parts of the following: (10 × 2 = 20)

(a) Write short notes on the different components of AWT.

(b) What are exceptions? When are they used? Explain with a code snippet.

(c) define I/O operations used in java with the help of program explain how I/o is done for creation/ append a file.

5. Attempt *any two* parts of the following: (10 × 2 = 20)

(a) What are the collections in Java? Where are they used?

(b) (i) What do you mean by database connectivity? How many types of connectivity are there in java.

(ii) Write a short note on different types application of java.

(c) Why the need for migrating from C++ to Java was felt in software development community? Describe?

Odd Semester Examination-2016

B.Tech (SEMESTER - III)

DATA STRUCTURES

[Time : 3 Hours] [Maximum Marks :100]

Note : Attempt **all** questions.

1. Attempt **any four** questions : [5×4=20]

   (a) Discuss time & space complexity. Also discuss best, worst & average case for finding a given no from an array of integers.

   (b) Write a program in C to implement Stack using Linked List.

   (c) Write an Algorithm to evaluate Postfix Expression. Convert the following infix expression into Equivalent Postfix Expression.

   $Q : ((A + B) * D) \uparrow (E - F)$

155

(d) What is Recursion? Explain the significance of Recursion. Write an recursive function to print Fibonacci Number upto the given no.

(e) What are advantages & disadvantages of Array? Show how to implement two stack in one array.

2. Attempt **any four** questions : [5×4=20]

(a) Discuss the various operation of queues ? List its Application.

(b) What is priority queue? Explain priorty queue by taking suitable example.

(c) What do you understand by linked list? What are its advantages & disadvantages over an Array? Write a Program to reverse a singly linked list.

(d) Explain circular queue. Also explain difference between circular & linear queue.

(e) Explain Garbage Collection & Compaction?

3. Attempt **any two** questions : [10×2=20]

(a) Discuss Binary Search Tree. Explain Insertion & Deletion in Binary Search Tree by taking an example with Algorithm.

15.6

(b) Explain Huffman Algorithm? Also discuss it with proper example.

(c) What is threaded Binary tree? How it can be represented in Computer Memory ?

4. Attempt **any two** questions : [10×2=20]

(a) Write pseudo Code for Heap Sort. Analyze its running time. Perform Heap Sort on following list of integers :

21, 1, 34, 28, 6, 85, 23, 17, 22, 80, 11, 2, 7, 25

(b) What is Hash Table? Explain its purpose. How the use of Hash Table is more beneficial as compared to its contemporary technique?

(c) Can we use Binary search tree technique anywhere? Justify your answer. Analyze Best, Average and Worst case Behaviour of Binary Search. Show the steps of Binary Search for finding 28 in given list of numbers :

2, 7, 12, 15, 18, 20, 22, 26, 28, 30, 33, 36, 39, 40, 45, 50.

157

5. Attempt **any two** questions : [10×2=20]

(a) How the files are organized on physical storage media? Explain in detail.

(b) What is text file? How it is different from other types of files. List the other advantages & disadvantages of sequential, direct & indexed file organization.

(c) Explain B Tree & B+ Tree Index File with proper example?

----- X -----

158

Paper Code & Roll No. to be filled in your Answer Book

Roll No. ☐☐☐☐☐☐☐☐☐☐☐

Odd Semester Examination-2016

B.Tech. (Semester-III) EC

DIGITAL ELECTRONICS AND DESIGN ASPECTS

[Time : 3 Hours] [Maximum Marks :100]

Note : Attempt **all** questions.

1. Attempt **any four** parts of the following : [5x4=20]

(a) Determine the base 'b' in each of the following cases:

(i) $(361)_{10} = (551)_b$

(ii) $(859)_{10} = (5B7)_b$

(b) Define Hamming code of error detection. Obtain 7-bit Hamming code for the message signal 1101 by using even parity.

(c) Using K-Map simplify the following expression:

$$f(A, B, C, D) = \Sigma_m (0, 1, 3, 7, 9, 11, 12)$$

(d) Explain Even and Odd parity methods for the detection of 1-bit binary error.

(e) Convert the following numbers to the base as indicated:

(i) $(101101)_2 = (?)_{10}$

(ii) $(56)_{10} = (?)_8$

(iii) $(A46)_{16} = (?)_2$

(f) Convert the followning expressions to the canonical form:

(i) $F = AB' + A'C + A$

(ii) $F = (A + B)(B' + C)$

2. Attempt **any four** parts of the following : [5×4=20]

(a) Design a 32:1 Mux by using 8:1 Mux and 4:1 Mux.

(b) Implement the following function by using 8:1 Mux

$$f(A, B, C, D) = \Sigma_m (0,1,2,4,7,11,12,13,15)$$

(c) Explain the working of 3:8 Decoder.

(d) What are the differences between normal encoder and priority encoder? Design a 4-input priority encoder.

160

(e) Design a 4-input combinational circuit that converts binary code to gray code.

(f) What are the drawbacks of a full adder? Explain how a parallel adder removes the drawback of a full adder?

3. Attempt **any two** parts of the following : [10×2=20]

(a) (i) What is Race-Around condition? Explain the master-slave flip-flop.

(ii) Analyze the circuit shown in fig. 1 to produce Boolean algebraic expression for the circuit outputs.

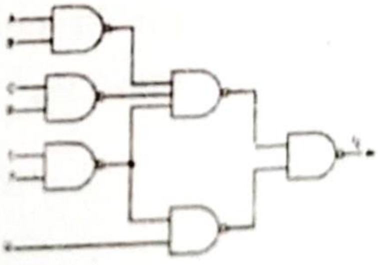


Fig. 1

(b) Explain the basic working of JK Flip-Flop. Design D Flip-Flop using JK Flip-Flop.

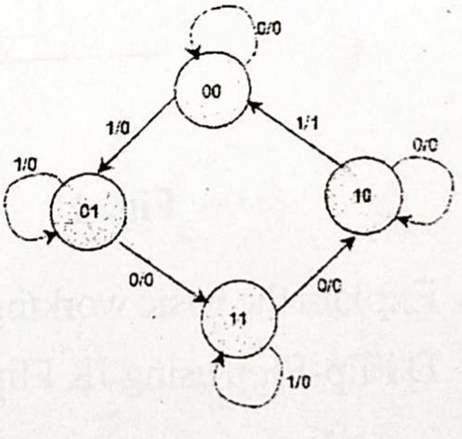
(c) Differentiate synchronous and asynchronous sequential circuit. Design a synchronous counter that goes through the counting sequence 1-2-4-7-1.... By using D Flip-Flop.

4. Attempt **any two** parts of the following : [10×2=20]

(a) Give the classification of logic families. What are the different parameters that govern the performance of a logic family?

(b) With the help of neat and clean diagram explain the working of TTL NAND gate. Write the comparative table of various logic families.

(c) (i) For the following state diagram, design the synchronous sequential circuit by using D Flip-Flip:



(ii) What is the drawback of SR Flip-Flop? Explain how it is overcome by using JK Flip-Flop?

TCS-304 202 Printed Pages : 3

Paper Code & Roll No. to be filled in your Answer Book

Roll No. ☐☐☐☐☐☐☐☐☐☐☐

Odd Semester Examination-2016

B.Tech (Semester-III)

OBJECT ORIENTED PROGRAMMING

[Time : 3 Hours] [Maximum Marks : 100]

Note : Attempt **all** questions. All questions carry **equal** marks.

1. Attempt **any four** questions : [5×4=20]

   (a) What do you understand by Object Oriented Programming? Also explain its features, pros & cons ?

   (b) What is State Diagram? Explain the State Diagram for ATM?

   (c) Explain the stages of Object Modelling Technique.

   (d) Explain what is abstract class? How it is different from concrete class?

   (e) Explain Links, Association and Multiplicity with example.

166

2. Attempt any four questions : [5×4=20]

(a) Prepare a DFD for computing volume and surface area of cylinder? Discuss several ways of implementing DFD?

(b) How does String class differ from String buffer class? Write a program which will read a string and rewrite it?

(c) Explain ER diagram with example.

(d) Discuss Event & State? Also explain event state diagram for phone call.

(e) Compare SA/SD and JSD methodologies.

3. Attempt any two questions : [10×2=20]

(a) What is an Applet? Describe the life cycle methods of Java Applet? Also explain ways to execute the Applet?

(b) Explain Multiprocessing & Multithreading with help of suitable example. What are different layout available in Java?

(c) Explain the rules for assigning the values of expression to a variable. How can be truncating a number with the help of methods, like round, ceil and floor?

167

4. Attempt **any two** questions : [10×2=20]

(a) What do you mean by AWT? Explain its application, working & controls with windows?

(b) Give reasons why exception handling techniques should not be used for conventional program control? Discuss how exception handling is done in Java?

(c) Differentiate between String and String Buffer for a string str = "PAYAL" , write a program to display the str in lower case?

5. Attempt **any two** questions : [10×2=20]

(a) Explain what was the need of migrating from C++ to Java in software development.

(b) Differentiate JDBC with ODBC. Also explain different drivers in JDBC.

(c) What is java swing? Explain it with proper example.

----- x -----

168

TCS-301(DS) **339** **Printed Pages : 4**

Paper Code & Roll No. to be filled in your Answer Book

Roll No. ☐☐☐☐☐☐☐☐☐☐☐

Odd Semester Examination-2016

B.Tech (Semester-III)

DISCRETE STRUCTURES

[Time : 3 Hours] **[Maximum Marks : 100]**

Note : All questions are compulsory.

1. Attempt **any four** questions : [5×4=20]

   (a) For any Set A & B, prove that

   $$P(A \cap B) = P(A) \cap P(B)$$

   (b) In a group of 52 persons, 16 drink tea but not coffee and 33 drink tea.

      (i) How many drink tea and coffee both?

      (ii) How many drink coffee but not tea?

   (c) Consider a function f:A→B and g:B→C prove that if f, g, and gof are one to one and onto then $(gof)^{-1}=f^{-1} o g^{-1}$.

169

(d) Prove that $A-(BUC)=(A-B)\cap(A-C)$.

(e) Prove that intersection of two equivalence relations is also an equivalence relation.

2. Attempt **any four** questions : [5×4=20]

(a) Show that the set of cube root of unity is an abelian group with respect to multiplication.

(b) Show that the set of N natural numbers is a semi group under the operation $x*y=\max(x, y)$.

(c) Prove that the set $G=\{0, 1, 2, 3, 4, 5\}$ is a finite abelian group of order 6 with respect to addition modulo 6 as the composition in G?

(d) Prove that the order of each subgroup of finite group G is a divisor of the group G.

(e) If $(G,*)$ is a group then prove that $(a * b)^{-1} = a^{-1} * b^{-1}$ where $a, b \in G$.

3. Attempt **any two** questions : [10×2=20]

(a) What is meant by Hasse Diagram? Draw the Hasse diagram of relation R on A where $A=\{1,2,3,4\}$ and

R = {(1,1), (1,2), (2,2), (2,4), (1,3), (3,3), (3,4), (1,4), (4,4)}.

(b) What is complemented lattice and bounded lattice? Explain by taking a suitable example.

(c) Prove that the Dual of Lattice is also lattice?

Attempt **any two** questions : [10×2=20]

(a) Give the symbolic form of the following statements :

(i) Some men are genius.

(ii) For every x, there is a greater positive integer.

(iii) Given any positive integer, there is a greater positive integer.

(iv) Everyone who likes fun will enjoy each of these plays.

(v) All healthy people eat an apple a day.

(b) Differentiate between tautology and contradiction.

171

(c) Given that the value of $p \rightarrow q$ is false, determine the value of $(\sim p \vee \sim q) \rightarrow q$?

5. Attempt **any two** questions : [10×2=20]

(a) Solve the recurrence relation $y_{n+2}-2y_{n+1}+y_n=0$ by using generating function with the boundary condition $y0=2$, $y1=4$.

(b) Show that Maximum number of edges in a simple graph with n vertices is $n(n-1)/2$?

(c) Prove that by mathematical induction that $6^{n+2}+7^{2n+1}$ is divisible by 43 for each positive integer.

----- X -----

175

Roll No. | | | | | | | | | | |

Odd Semester Examination 2019-20
B.TECH (III SEM)CSE/IT
DISCRETE STRUCTURE-BCST 302/BITT 302

Time : 3:00 hr **Max. Marks : 100**

Note: Attempt all questions :

Q1. (Attempt any four. All question carry equal marks) **4*5 = (20 marks)**

Define the following terms:

a) Deduction Theorem
b) Different types of functions
c) Pseudo Boolean Lattices
d) Error Correcting Code
e) Eulerian and Hamiltonian walk

Q.2. (Attempt any four. All question carry equal marks) **4*5 = (20 marks)**

a) Show that if any seven points are chosen in a regular hexagon whose sides are of 1 unit, then two of them must be no further apart than 1 unit.
b) Determine the number of edges in a graph with 6 nodes, 2 nodes of degree 4 and 4 nodes of degree 2. Draw two such graphs.
c) Define injective, surjective and bijective functions. if f: R→R and g: R→R defined by $f(x)=x+2$ and $g(x)=x^2$. Find i) fogof ii) gofog.
d) Let S= {1, 2, 3, 4, 5} and A=S×S. Define the following relation R on A: (a,b) R(c,d) if and only if ad=bc show that R is an equivalence relation and compute A/R.
e) Write a program to display factorial of given number. Take input from command line arguments.

Q.3. (Attempt any four. All question carry equal marks) **4*5 = (20 marks)**

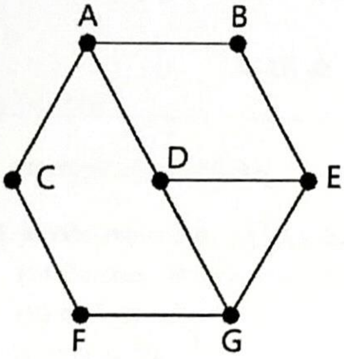
a) Prove that intersection of any two sub-groups of a group (G, *) is again a sub-group of G.
b) The mean yield per plot of a crop is 17 kg and standard deviation id 3 kg. If distribution of yield per plot is normal, find the percentage of plots giving yields between 15.5 kg and 20 kg.
c) What is the difference between disjoint union (sum) and power sets.
d) Explain the following terms:
    - Satisfiability
    - Validity
    - Completeness
e) Explain the significance of complete partial ordering,chain, lattice, complete and distributive.

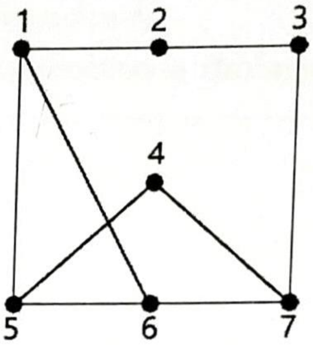
PTO

Q.4. (Attempt any two. All question carry equal marks) **2*10= (20 marks)**

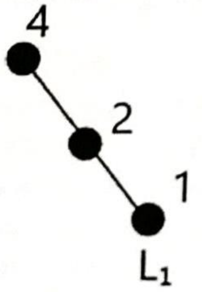
a) Show that $(\neg q\wedge (p\Rightarrow q)) \Rightarrow\neg \overset{\vee}{p} (\neg q\wedge (p\Rightarrow q)) \Rightarrow\neg p$ is a tautology.

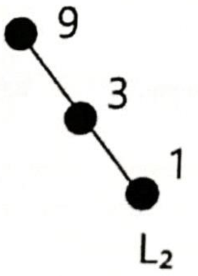
b) Determine whether following graphs are isomorphic





c) Consider the chain of divisors of 4 and 9, i.e. $L_1=\{1, 2, 4\}$ and $L_2=\{1, 3, 9\}$ Find the Hasse diagram





of $L_1\times L_2$.

Q.5. (Attempt any two. All question carry equal marks) **2*10= (20 marks)**

a) It was found that in a class, 80 students are passed in English, 60 in Science and 50 in Mathematics. It was also found that 30 students passed in both English and Science, 15 students passed in both English and Mathematics and 20 students passed in both Mathematics and Science, 10 Students passed in all three subjects. If there are 150 students in the class, find

i) How many students passed in at least one subject?

ii) How many students passed in English only?

How many students failed in all three subjects?

b) Express the following using quantifiers if K(x): x is student, M(x):' x is clever, N(x): x is successful.

i) There exists a student.

ii) Some students are clever.

iii) Some students are not successful.

c) Rewrite the following statements using quantifiers. Write the .negation of these propositions using quantifiers and then rewrite the negation in English:

i) At least one student does not live in the hostel.

ii) All students live in the hostel.

Roll No.

☐☐☐☐☐☐☐☐☐☐

ODD SEMESTER EXAMINATION 2019-20
B. TECH III SEM (Old Syllabus)
DATA STRUCTURE

[3 HOURS] [Total Marks: 100]

Total no. of printed pages: 2

Note: Attempt all the questions
All questions carry equal marks

Q1. Attempt any four parts of the following: **(5*4)**

(a) What is data Structure? Explain the different types of data structure with examples.

(b) Briefly explain:
(i) Algorithm Complexity (ii) Time space tradeoff

(c) Let array [25] [25] is an integer array. Calculate the address of array [20] [25] using both column-major and row-major arrangements.

(d) Explain the concept of Garbage collection and Compaction.

(e) How does Dynamic Memory Allocation help in managing data?

Q2. Attempt any four parts of the following: **(5*4)**

(a) Briefly explain:
(i) Dequeue (ii) Priority Queue

(b) Write the algorithm to find the second smallest element in the given array.

(c) Write a program which gives solution to the Towers of Hanoi problem for n disks. Test the program using n=3.

(d) A Binary Search Tree has 10 nodes, the Inorder and Preorder traversals of Tree T yields following sequences of nodes. Draw the tree T.
Inorder: D B H E A I F J C G Preorder: A B D E H C F I J G

(e) Write an algorithm for Insertion sort.

Q3. Attempt any two parts of the following: **(10*2)**

(a) Write an algorithm to reverse a linear linked list.

(b) Write a C Function for linked list representation of Stack. Write all the primitive operations.

(c) Translate given Infix expressions into its equivalent Postfix expression:

i. A*(B+D)/E-F*(G+H/K)
ii. (F- G) * ((A + B) * (C – D))/ E

P.T.O

Q4. Attempt any two parts of the following: **(10*2)**

(a) Using Merge sort algorithm, Sort the following elements 15, 10, 5, 20, 25, 30, 40, 35.

(b) Write C program to create a circular queue and write a function to delete an element when circular queue has only one element.

(c) What is doubly linked list? Write an algorithm and a C function to insert a node at the end of a doubly linked list.

Q5. Attempt any two parts of the following: **(10*2)**

(a) Define Binary tree, Complete Binary Tree and Binary Search Tree. Write Algorithms to obtain traversal of a Binary Search Tree in Preorder, Postorder and Inorder.

(b) Define Hashing. How do collisions happen during hashing? Explain the different techniques of resolving collision.

(c) Write a C program to implement operation Insert and search in a Binary search tree.
